

Presentation for

February 22, 2007

Reforming Parking Policies to Support Smart Growth

prepared for

Metropolitan Transportation Commission Technical Advisory Committee



Wilbur Smith Associates

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Parking Demand Estimation Methodology



Objective: Estimate downtown parking demand based on

- Existing & Future Land Uses
- Parking Availability
- Parking Costs
- Shared Parking Opportunities
- Transit Availability
- Pedestrian/Bicycle Accessibility
- Auto Ownership Characteristics

Parking Demand Model Inputs



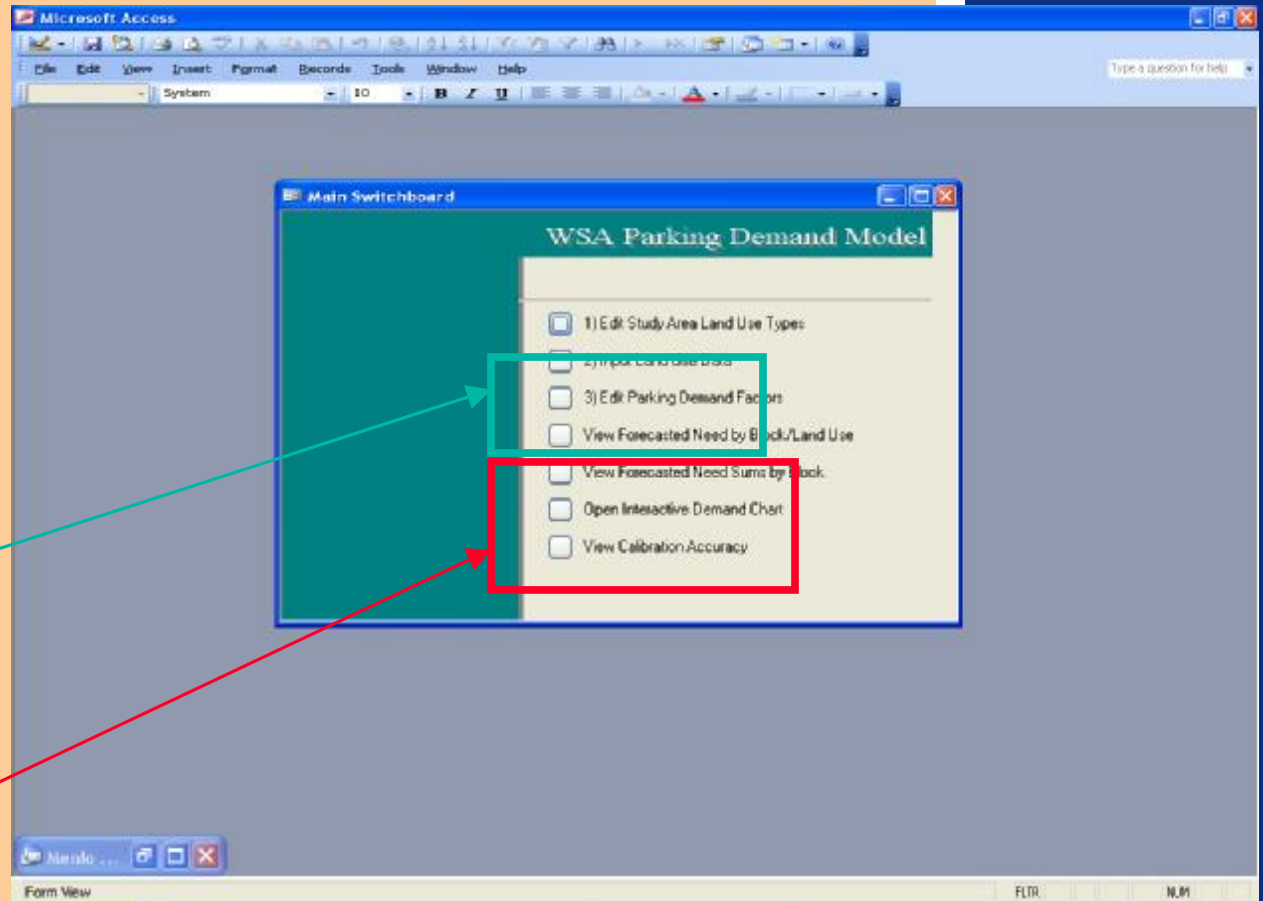
Data used for model calculations and calibration:

- **Current and Expected Land Uses**
- **Existing Parking Supply (both on- and off-street)**
- **Peak Hour Parking Occupancy (on- and off-street)**
- **Current Parking Zoning Requirements**

Model Start-up Page



- Provides navigation between model components
- Walks user through **data entry steps**
- Links to **results & analysis**



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Data Entry 1: Land Use Categories



- Model automatically generates **category ID numbers** to prevent duplicates
- Land Use Category** changes take immediate effect throughout model
- Specifying each **Unit of Measure** (e.g. kSF or DU) ensures that rates correspond with data during calculations

Category #	Name of Land Use Category	Unit of Measure	Delete Category
1	Single Family Residential	DU	Delete Category
2	Multi-Family Residential	DU	Delete Category
3	Motel	kSF	Delete Category
4	Retail	kSF	Delete Category
5	Furniture/Hardware	kSF	Delete Category
32	Auto Repair	kSF	Delete Category
33	Restaurant	kSF	Delete Category
34	Service	kSF	Delete Category
35	Bank	kSF	Delete Category
36	Office-General	kSF	Delete Category
37	Office-Real Estate	kSF	Delete Category
38	Office-Government	kSF	Delete Category
39	Office-Medical	kSF	Delete Category

Return to
Start Page



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Data Entry 2: Existing & Future Parcel Use



- Land use data entered by type, **amount** & **block**
- Land use types are linked from previous entry form
- Pipeline** check box codes the parcel as an expected addition (facilitates current vs. future demand calculations)

Category #	Name of Land Use Category	Block	Type of Land Use	Unit	Use Amount	Pipeline
1	Single Family Residential	14	5 Furniture/Hardware	KSF	30	<input type="checkbox"/>
2	Multi-Family Residential	14	4 Retail	KSF	28.8	<input type="checkbox"/>
3	Motel	14	36 Office-General	KSF	2.5	<input type="checkbox"/>
4	Retail	15	33 Restaurant	KSF	28.1	<input type="checkbox"/>
5	Furniture/Hardware	15	34 Service	KSF	26.1	<input type="checkbox"/>
32	Auto Repair	15	35 Bank	KSF	9.6	<input type="checkbox"/>
33	Restaurant	15	36 Office-General	KSF	5	<input type="checkbox"/>
34	Service	16	37 Office-Real Estate	KSF	28.1	<input type="checkbox"/>
35	Bank	16	38 Office-Government	KSF	13.7	<input type="checkbox"/>
36	Office-General	16	39 Office-Medical	KSF	5.5	<input type="checkbox"/>
37	Office-Real Estate	16	40 Church	KSF	10.92	<input type="checkbox"/>
38	Office-Government	16	4 Retail	KSF	3.8	<input type="checkbox"/>
39	Office-Medical	16	30 Restaurant	KSF	13.7	<input type="checkbox"/>



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Data Entry 3: Demand Rates



- o Alternative mode, auto ownership & shared parking **factors** are summed, subtracted from 100% then multiplied with
 - Peak Rate (based on ITE/ULI or parking code and calibrated to existing demand)
 - Short and Long Term demand split
 - Peak hour adjustment (by land use type)
- o Rates generate in real time, allowing users to observe the effect of factor adjustments

Microsoft Access

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Demand Factors

Parking Demand Rate Factors by Land Use

Land Use Category	Per Unit Peak Rate	ST % of Demand	Peak Hour Adjustment	Walking Factor	Biking Factor	Transit Factor	Auto Ownership Factor	Shared Parking Factor	ST Rate	LT Rate	Combined
Single Family Residential	2	0.1	1	0	0	0	0	0	0.2	1.8	2
Multi-Family Residential	1.5	0.1	1	0	0	0	0	0	0.15	1.35	1.5
Motel	1.3	0.1	0.3	0	0.01	0.01	0	0.38	0.023	0.2106	0.234
Retail	6	0.5	0.5	0.01	0.01	0.01	0	0.72	1.215	0.135	1.35
Furniture/Hardware	2	0.9	0.9	0.01	0.01	0.01	0	0.72	0.405	0.045	0.45
Auto Repair	2.5	0.5	0.5	0.025	0.025	0.025	0	0.225	0.438	0.4375	0.875
Restaurant	20	0.5	0.5	0.05	0.01	0.01	0	0.78	1.35	0.15	1.5
Service	4	0.9	0.9	0.05	0.05	0.05	0	0.65	0.648	0.072	0.72
Bank	4.2	0.9	0.9	0.05	0.05	0.05	0	0.35	1.261	0.169	1.89
Office-General	4	0.3	0.8	0.01	0.01	0.15	0	0.08	0.72	1.68	2.4
Office-Real Estate	4	0.3	0.8	0.01	0.01	0.15	0	0.08	0.72	1.68	2.4

Record: 14 of 19

Short-Term % of Demand

Total Demand Calculation



- Short Term, Long Term and Total Need calculated by multiplying

§ Each parcel's land use amount (entered previously at Entry Form 2), and

§ The parcel's corresponding land use Demand Rates (from Entry Form 3)

Microsoft Access

STLT Need

Predicted Parking Demand Per Parcel

Block	Land Use	Use Amount	STRate	LTRate	STNeed	LTNeed	Total Need
17	Vacant	7.9	0	0	0	0	0
19	Auto Repair	4.95	0.4375	0.4375	1.950625	1.950625	3.90125
18	Bank	2.5	1.701	0.189	4.4226	0.4914	4.914
19	Furniture/Hardware	3.6	0.405	0.045	1.458	0.162	1.62
19	Motel	8	0.0234	0.2106	0.1872	1.6848	1.872
19	Multi-Family Residential	40	0.15	1.35	6	54	60
19	Office-General	7.8	0.72	1.68	5.616	13.104	18.72
19	Office-Pool Estate	11	0.72	1.68	7.92	18.48	26.4
19	Retail	7.6	1.215	0.135	9.234	1.026	10.26
19	Service	4	0.648	0.072	2.592	0.288	2.88

Record: 14 of 110

Open Interactive Chart Return to Main Page

Interactive Chart

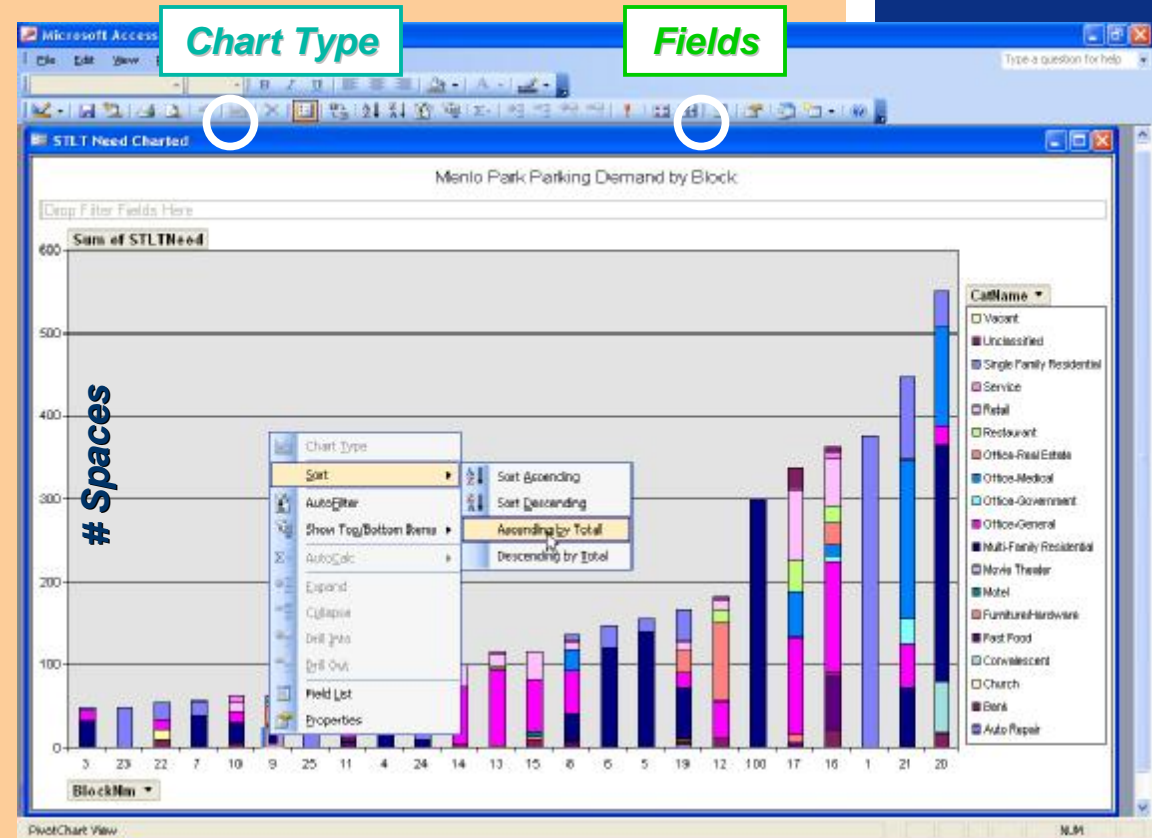


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Analysis: Interactive Chart



- Displays parking demand data by block number, land use category, existing or future, etc.
- Select **Chart Type**
- **Fields** window holds data types (e.g. ST Demand, LT Demand, Combined Demand) that can be dragged onto graph, axes, or categories



Block Number

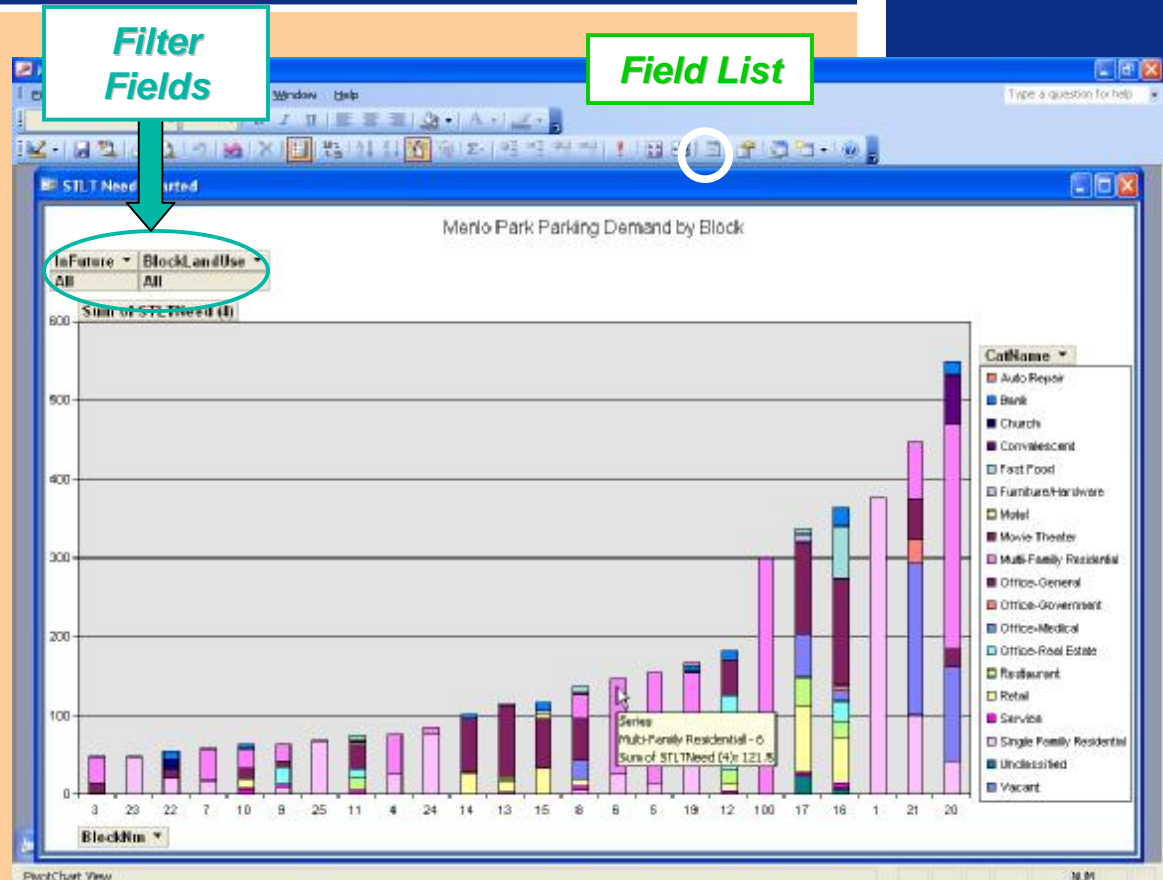


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Analysis: Filter Fields



- By clicking on **'Filter Fields'** the user can narrow the dataset being analyzed
- E.g. to see only parking demand for specific blocks, click on **'BlockNm'** and uncheck unwanted blocks



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Analysis: Existing vs. Pipeline Projects



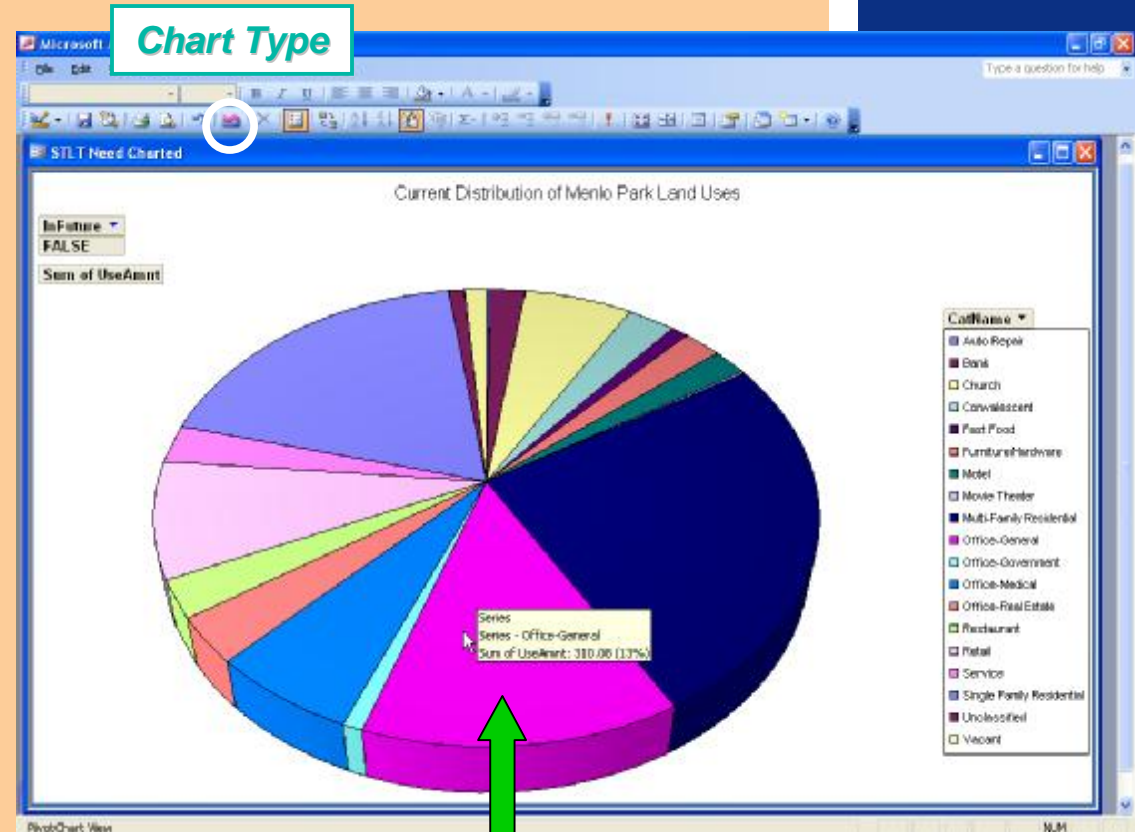
- Or, select **InFuture** field and uncheck 'False' to observe the pipeline projects' effect on demand
- In this chart we have selected Short Term Need by dragging its field into the chart area from the **Field List**, and dragged Land Use Type to the horizontal axis



Analysis: Pie Chart



- Pie Chart of the current uses in Menlo Park
- **Category-specific information** appears when the cursor hovers over a category
- Data can also be displayed in a spreadsheet format to facilitate numeric analysis



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Analysis: View Demand by Block



- Summation data for ST, LT and Total parking demand by block is opened from the Main Page
- Records can be quickly sorted, narrowed by criteria, or exported to other formats

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STLT Need

Sum of Need by Block

Predicted Parking Need by Block

Block Number	Sum of ST Demand	Sum of LT Demand	Total Demand
1	37.6	399.4	396
3	7.244	40.236	47.48
4	7.7	69.3	77
5	15.5	139.5	155
6	14.75	132.75	147.5
7	5.7	51.3	57
8	40.94264	87.82236	136.7656
9	16.43988	46.80432	63.2432
10	28.570875	34.411675	62.98275
11	39.13795	35.3905	74.5195
12	29.388	100.901	130.289

Record: 14 of 24

Block number (if odd numbering scheme, use another table to define blocks, then enter the ID from that table here)

NUM

Demand Model

Use Types

Factors

by Block/Land Use

Sums by Block

and Chart

by

2.98

Return to Main Page

Return to Main Page

Database Reports



- This report template displays and summarizes block-by-block parking demand derived by the model
- Different summary, calculation, and display options can be specified by the user
- Automatically reflect any data or rate changes

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STLT Need Report

Menlo Park Projected Parking Demand

Land Use	Use Amount	Short Term Demand Rate	Long Term Demand Rate	Short Term Demand	Long Term Demand	Total Demand
Block 1						
Single Family Residential	100	0.2	1.0	20.0	100.0	120.0
Total	100			20.0	100.0	120.0
Block 2						
Multi-Family Residential	30	0.15	1.00	4.5	30.0	34.5
Office General	62	0.12	1.00	7.44	62.0	69.44
Single Family Residential	1	0.2	1.0	0.2	1.0	1.2
Total	93			12.14	93.0	105.14
Block 3						
Multi-Family Residential	34	0.15	1.00	5.1	34.0	39.1
Single Family Residential	15	0.2	1.0	3.0	15.0	18.0
Total	49			8.1	49.0	57.1
Block 4						
Multi-Family Residential	94	0.15	1.00	14.1	94.0	108.1
Single Family Residential	7	0.2	1.0	1.4	7.0	8.4
Total	101			15.5	101.0	116.5
Block 5						
Multi-Family Residential	30	0.15	1.00	4.5	30.0	34.5
Single Family Residential	15	0.2	1.0	3.0	15.0	18.0
Total	45			7.5	45.0	52.5
Block 6						
Multi-Family Residential	30	0.15	1.00	4.5	30.0	34.5
Single Family Residential	15	0.2	1.0	3.0	15.0	18.0
Total	45			7.5	45.0	52.5

Monday, February 15, 2007

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Parking Rates: Office



Case Study Area	Land Uses	Demand Rate			Existing Requirements
		Short Term	Long Term	Total	
Union City	Office/R&D	0.6	1.4	2.0	3.3
Vallejo (DT)	Office (Gen)	0.6	1.5	2.2	3.5
	Office (Govt)	0.3	1.4	1.7	3.5
Vallejo (WF)	Office	0.6	1.5	2.2	3.5
Morgan Hill	Office	0.7	1.6	2.3	4.0
Menlo Park	Office (Gen)	0.7	1.7	2.4	5.0
	Office (Govt)	0.4	1.5	1.9	5.0
Hercules	Office	0.7	1.6	2.2	3.0

- **Model generated lower parking rates than city requirements**
- **Discrepancy indicates potential for parking code revisions, and mixed use/shared use exemptions**

Parking Rates: Retail & Restaurant



Case Study Area	Land Use	Demand Rate			Existing Requirements
		Short-Term	Long -Term	Total	
Union City	Retail	1.0	0.1	1.1	5.7
	Bank	1.4	0.2	1.6	8.3
Vallejo (Downtown)	Retail	1.1	0.1	1.2	1.7
	Restaurant/Bar	1.2	0.1	1.4	20.0
Vallejo (Waterfront)	Retail	1.1	0.1	1.2	1.7
Morgan Hill	Retail	1.2	0.1	1.3	3.5
	Restaurant/Bar	2.3	0.3	2.6	10.0
Menlo Park	Retail	1.2	0.1	1.4	6.0
	Restaurant/Bar	1.4	0.2	1.5	6.0
	Bank	1.7	0.2	1.9	6.0
Hercules	Retail	1.1	0.1	1.3	3.5

- Model generated significantly lower parking rates than city requirements
- Discrepancy indicates potential for parking code revisions and mixed use/shared use exemptions

Parking Demand Elasticity Theory



20:5 Demand Elasticity Factor

- i.e. 5% reduction in parking demand assumed for every 20% increase in parking price
- Standard assumption for parking revenue forecasting in the absence of detailed market research

Price Sensitivity



- Demand curve calibrated for 15% elasticity assumption



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Next Steps



- o **Incorporate Pricing Module into Model based on:**
 - **Change in Average Hourly Cost of Parking**
 - **Demand Growth Factors**
 - **Price Elasticity**
 - **Separate Sensitivity for employees versus other parkers**